Appendix D.

SOP – Operation of PM_{10} High Volume Air Sampler

- Sampler Operation
- Digital Timer Operation
- Total Volume Calculations

SAMPLER OPERATION

TE-6070, TE-6070D

1. After performing calibration procedure, remove calibrator and top loading adapter. Install TE-3000 Cartridge and remove filter holder frame.

2. Carefully center a new filter, rougher side up, on the supporting screen. Properly align the filter on the screen so that when the frame is in position the gasket will form an airtight seal on the outer edges of the filter.

3. Secure the filter with the frame, brass bolts, and washers with sufficient pressure to avoid air leakage at the edges (make sure that the plastic washers are on top of the frame).

4. Wipe any dirt accumulation from around the filter holder with a clean cloth.

Size Selective Inlet Shim Plate Part number TE-6001-24

An anodized aluminum Shim Plate is supplied on top of the 1st stage plate of the SSI and can be seen by opening the body of the SSI. This collection Shim Plate needs to be heavily greased according to the following frequency and procedure.

Cleaning Frequency

Average TSP at Site	Number of Sampling Days	Interval Assuming Every 6th Day Sample
40 ug/m^3	50	10 months
75 ug/m^3	25	5 months
150 ug/m^3	13	3 months
200 ug/m^3	10	2 months

Cleaning of the Shim Plate is done after removal from the SSI.

- To remove the Shim Plate, unlatch the four SSI hooks located on the sides of the SSI body. Slowly tilt back the top inlet half exposing the 9 acceleration nozzles. Tilt the SSI top half until the SSI body support strut drops and locks into the second, fully open, notch and supports the top half of the inlet. Two Shim Plate Clips located on the right and left sides should be rotated 90° to release the fastening pressure on the shim. The Shim Plate should be handled by the edges and slowly lifted vertically to clear the height of the 16 vent tubes and pulled out forward toward the operator. A clean cloth is used to wipe the soiled grease from the Shim Plate. Acetone or any commercially available solvent can be used to clean the Shim Plate to its original state.
- Clean the interior surfaces of the SSI using a clean cloth.
- Place Shim Plate on a clean flat surface away from the rest of the SSI assembly and spray the

Shim Plate with a coating of Dow Corning Silicone #316. This grease is available from Tisch Environmental or from your local Dow Corning Distributor.

- Make sure the Shim Plate is clean, and apply a "generous" amount of the silicone spray after shaking the aerosol can. Spray holding the can 8 to 10 inches away. Spray is necessary in the areas which are below the acceleration nozzles. Allow 3 minutes for the solvent in the spray to evaporate leaving the final greased Shim Plate tacky, but not slippery. After drying, a cloudy film is visible, with a film thickness at least twice the diameter of the particles to be captured. Overspraying with the silicone will not hurt the performance of the SSI, so when in doubt, apply more silicone spray.
- Before reinserting the greased Shim Plate, wipe off all interior surfaces of the SSI and brush any loose dirt or insects off the Bug Screen located below the removable Shim Plate.
- Lift the greased Shim Plate by the edges and place it on the SSI 1st stage plate over top of the vent tubes with the greased side up in reverse order of the above removal procedure. Swing the two Shim Plate Clips over the edge of the greased Shim Plate to hold it securely in place.
- Close the SSI making sure of a good snug fit. Latch the 4 hooks firmly in place.

5. Close PM10 Inlet carefully and secure with all hooks and catches.

6. Make sure all cords are plugged into their appropriate receptacles and on all VFC systems make sure the clear tubing between the filter holder pressure tap and the bulkhead fitting is connected (be careful not to pinch tubing when closing door).

7. Prepare the Timer: See Timer Instructions

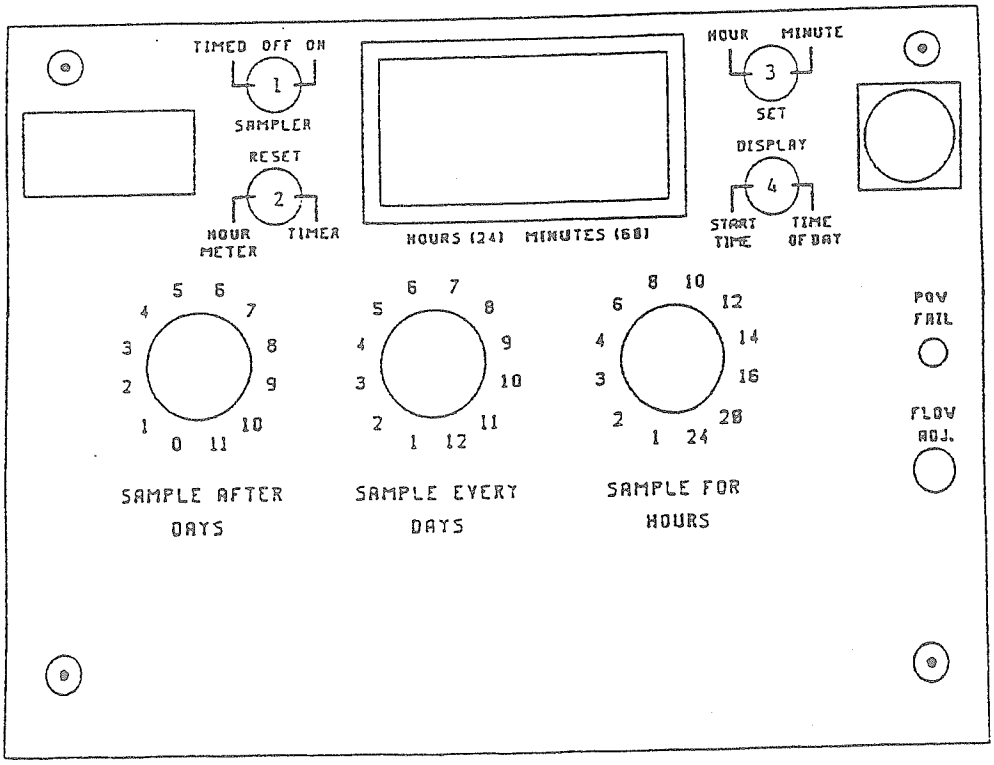
8. At the end of the sampling period, remove the frame to expose the filter. Carefully remove the exposed filter from the supporting screen by holding it gently at the ends (not at the corners). Fold the filter lengthwise so that sample touches sample.

9. It is always a good idea to contact the lab you are dealing with to see how they may suggest you collect the filter and any other information that they may require.

Operating Instructions for TE-302 Digital Timer

To set up the digital timer:

- Start with the Sampler Switch (Timed – Off – On) Switch #1, in the Off position.
- If you need to test or adjust the blower motor turn the Sampler switch to On. When done with adjusting, turn it back to Off.
- Place the rotary switches in the desired positions.
- If today is Friday and you want the first sample time on Sunday, turn the "Sample After Days" switch to position 2.
- If you want to run the sampler every Sunday after that, turn the "Sample Every Days" switch to position 7, (for six day sampling use position 6).
- Turn "Sample for Hours" to desired number of running hours.
- Next put the Display switch, Switch #4, in the Start Time position.
- Then using the Set switch, Switch #3, enter the start time, hours and minutes.
- Next put the Display switch, Switch #4, in the Time of Day position.
- Then using the Set switch, Switch #3, enter the current time, hours and minutes.
- Now press and release the Reset switch, Switch #2, toward Timer. A small triangle on the display will start blinking. This indicates the timer is running.
- If you need to reset the Hour Meter to zero.
- Press and release the reset switch, Switch #2, twice, toward Hour Meter.
- Last thing to do is place the Sampler switch, Switch #1, (Timed – Off – On) in the Timed position.
- To turn off Power Failure Light turn Switch #4 to Start Time, if it is on Time of Day, or Time of Day if it is on Start Time. The light will reset next sampling period.



TOTAL VOLUME CALCULATIONS for Mass Flow Controlled PM10 Systems

TE-6070, TE-6070D

To calculate the total volume of air sampled through the (filter) during your sampling run, take a set-up reading (when you set the sampler up the SSP was 46.69, which is set up reading) and an ending reading, look at recorder chart and use the number where red ink pen stops, goes down, for our example lets assume the ending number was 45. Take 46.69 + 45 = 91.69 91.69/2 = 45.85. So the continuous recorder reading you would use is 45.85. Put that into formula on bottom of worksheet.

$$1/m((I)[Sqrt(Tav/Pav)]- b)$$

m = sampler slope
b = sampler intercept
I = average chart response
Tav = daily, weekly, monthly, or seasonal average temperature
Pav = daily, weekly, monthly, or seasonal average barometric pressure
Sqrt = square root

Example:

m^3/min = 1/17.6685((45.85)[Sqrt(291/757)]-(8.9094))
m^3/min = .0566 ((45.85)[Sqrt(.3844)] – 8.9094)
m^3/min = .0566 ((45.85)[.62] - 8.9094)
m^3/min = .0566 ((28.427) – 8.9094)
m^3/min = .0566 (19.5176)
m^3/min = 1.105
ft^3/min = 1.105 x 35.31 = 39.01
Total ft^3 = ft^3/min x 60 x hours that sampler ran

Assume our sampler ran 23.8 hours (end ETI reading - start ETI reading)

** Be certain ETI is in hours otherwise convert to hours **

Total ft^3 = 39.01 x 60 x 23.8 = 55,706.28 ft^3

Total m^3 = 1.105 x 60 x 23.8 = 1577.94 m^3

"Note" Reference page 66 see Appendix J for Filter Handling, Conditioning, Weighing, and Calculation of PM10 Concentration Measurements.